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Instruction Manual

JOHN FLUKE MFG. CO., INC.

OFFICIAL RECORDS STATION
FACILITY
APR 15 1963

ELECTRONICS FOR INDUSTRY

FLUKE

Preliminary Instruction Manual

for

FLUKE MODEL 853A

DIFFERENTIAL MULTIMETER

INSTRUMENTS / COMPONENTS

Serial No. 123 and above

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JOHN FLUKE MFG. CO., INC.
P. O. Box 7428
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October 20, 1967

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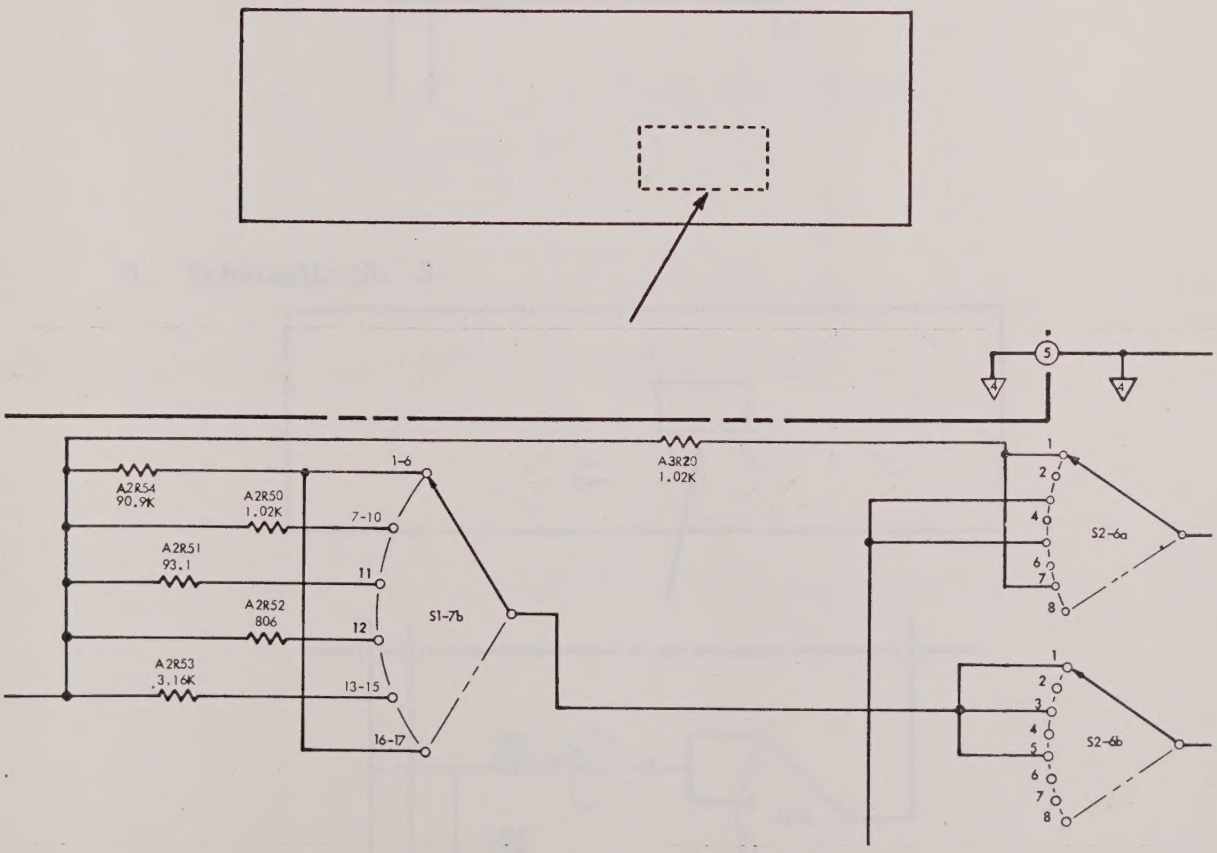
ERRATA

FLUKE MODEL 853A

The following changes have been incorporated in the Model 853A. For your convience, these changes are of the same size as the affected schematic areas. Consequently, they may be copied or cut out from this Errata sheet and installed directly over the affected areas of the schematics.

1. Schematic No. 1 (2 of 2)



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SECTION I
INTRODUCTION AND SPECIFICATIONS

1-1. INTRODUCTION

1-2. The Fluke Model 853A Differential Multimeter is a compact transistorized multimeter which allows conventional or differential measurement of dc or ac voltage, dc or ac current, and resistance. Voltage measurements may be made from zero volts to 1000 volts in four ranges. Current measurements from zero to 10 amperes are made in six ranges. Resistance measurements from zero to 100 megohms are made in seven ranges. The use of one meter scale for all ranges greatly simplifies all measurements. When the instrument is operated in the differential mode, an in-line digital readout is available from the front panel readout dials.

1-3. The Model 853A is designed for portable field or factory applications as well as for laboratory use and operates from line power or an internal 22 1/2 volt battery. The carbon battery may be replaced with a rechargeable nickel-cadmium battery pack by installation of option kit 853A-701. Upon installation of this option kit, the instrument is identified as the Model 853A-01 by a rear panel metal decal, included with the option kit. A tilt down carrying handle detents into the instrument's feet to serve as a tilt bail during bench top use of the instrument.

1-4. SPECIFICATIONS

1-5. DC VOLTMETER

RANGE
1, 10, 100, 1000 volts dc with 10% overranging capability.

ACCURACY
Differential
±(0.2% of reading + 0.02% of range).
Direct
±2% of full-scale.

INPUT RESISTANCE
11 megohms.

1-6. AC VOLTMETER

RANGE
1, 10, 100, 1000 volts ac with 10% overranging capability.

ACCURACY
Differential
±(0.5% of reading + 0.05% of range) from 30 Hz to 20 kHz.
±(1% of reading + 0.05% of range) from 20 Hz to 30 kHz.
Direct
±2% of full scale from 20 Hz to 30 kHz.

INPUT IMPEDANCE
1 megohm.

1-7. DC AMMETER

RANGE
100 microampere, 1 milliampere, 10 milliampere, 100 milliampere, 1 ampere, 10 ampere.

ACCURACY
Differential
±(0.2% of reading + 0.02% of range)
±(0.5% of reading + 0.05% of range) on 10 ampere range.
Direct
±2% of full-scale.

INSERTION LOSS
100 to 300 millivolt drop on all ranges.

1-8. AC AMMETER

RANGE
100 microampere, 1 milliampere, 10 milliampere, 100 milliampere, 1 ampere, 10 ampere.

ACCURACY
Differential
±(0.5% of reading + 0.05% of range) from 30 Hz to 10 kHz.
±(0.5% of reading + 0.05% of range) from 30 Hz to 3 kHz on 10A range.
±(1% down to 20 Hz).
Direct
±3% of full-scale from 20 Hz to 20 kHz.

INSERTION LOSS
100 to 300 millivolt drop on all ranges.

1-9. OHMMETER

RANGE
100 ohms, 1 kilohm, 10 kilohm, 100 kilohm, 1 megohm, 10 megohm, 100 megohm.

ACCURACY
Differential
±(0.2% of reading + 0.01% of range)
±(0.5% of reading above 10 megohms)
Direct
±3% of full scale.

1-10. ENVIRONMENTAL

OPERATING TEMPERATURE RANGE
Meets all specifications from 10°C to 40° C derated at 100 ppm/° C + 30 ppm of range beyond these limits to 0° C and 55° C.

STORAGE TEMPERATURE RANGE
Model 853A -40° C to +70° C.
Model 853A-01 -40° C to +50° C.

HUMIDITY
Within specifications up to 70% relative humidity.

SHOCK
Meets requirements of MIL-E-16400F.

VIBRATION
Meets requirements of MIL-T-945A and MIL-E-16400F.

1-11. GENERAL

ELECTRICAL DESIGN
Completely solid state.

OVERLOAD PROTECTION
Withstands 1200 volts rms on any voltage range; 12 amperes rms on 10 ampere range, 2 amperes on all other current ranges (fused above 2 amperes); 120 volts rms on the 100 ohm through 10 kilohm ranges; 230 volts rms on the 100 kilohm through 100 megohm ranges.

SEMICONDUCTOR PROTECTION
The Model 853 will not injure typical semiconductors in any range or mode.

INPUT POWER

MODEL 853A. 115/230 volts ac ±10%, 50 to 500 Hz, at approximately 3 watts, or 22 1/2 volt "B" battery which provides 80 hours of operation.

MODEL 853A-01. 115/230 volts ac ±10%, 50 to 500 Hz, at approximately 6 watts. Minimum of 40 hours operation on rechargeable nickel-cadmium batteries.

1-12. MECHANICAL

SIZE
11 1/2" wide by 5 1/4" high by 9" deep.

WEIGHT
Approximately 10 lbs.

OPTION KIT 853A-701
Used to convert the Model 853A battery power from a carbon battery to rechargeable nickel-cadmium batteries.

SECTION II

OPERATING INSTRUCTIONS

2-1. CONTROLS, TERMINALS, AND INDICATORS.

2-2. The function of the Model 853A controls, terminals, and indicators are listed in Figure 2-1.

2-3. PRELIMINARY OPERATING PROCEDURES

2-4. Connect the Model 853A line plug to 115 volts ac or to 230 volts ac, if the instrument is so wired. If your instrument is a Model 853A, perform steps a through c. If your instrument is a Model 853A-01, perform steps a, b, and d.

WARNING!

The round pin on the polarized three-prong plug connects the instrument case to power system ground. Use a three-to-two pin adapter when connecting to a two-contact outlet. For personnel safety, connect the short lead from the adapter to a high quality ground.

a. Place the MODE and RANGE switches to the desired measurement positions.

b. To operate your instrument on the internal batteries, hold the MODE switch to the BAT CHK position and note the meter reading. Minimum acceptable meter deflection is 0.2. If the batteries are adequately charged, disconnect the line power cord. The instrument will now operate on the internal batteries when the MODE switch is placed to the desired measurement mode.

c. If the Model 853A fails the battery check, replacement of the battery is necessary. Refer to paragraph 2-19 for battery replacement.

d. If the Model 853A-01 fails the battery check, operate the instrument on line power until the batteries are adequately charged. Should the batteries fail the battery check after the instrument has been operated for 16 hours on line power, replacement of the batteries may be necessary. Refer to paragraph 2-19 for battery replacement.

CONTROLS TERMINALS AND INDICATORS	FUNCTION
INPUT terminals	Provide connection to the circuit being measured. The 10 AMP terminals are used for connection to circuits for current measurements of above 1 ampere to a maximum of 10 amperes.
Meter	A single linear meter scale for all modes and ranges is used. Meter deflection is from left to right on the direct mode with a center-zero reference used on the differential mode.
RANGE switch	Selects the desired range for measurements of current, voltage, or resistance.
BAT CHG lamp	When lit, indicates that the Model 853A-01 is operating on line power and the batteries are being charged.
MODE switch	Provides selection of direct (DIR) or differential (DIFF) mode for measurement of ac current or voltage, dc current or voltage, or resistance. Resistance measurements are made with the MODE switch to the +DC positions. The MODE switch positions of +DC and -DC allow measurement of positive or negative dc voltage or current without switching of the test leads. The Model 853A BAT CHK position is spring-loaded to return to the OFF position. When the MODE switch is held to BAT CHK position, the meter will indicate the charge-state of the internal batteries. A meter deflection of 0.2 is the minimum acceptable value.
NULL SENS control	Adjust differential null sensitivity for an on-scale meter deflection. May also be used on the differential mode to calibrate end-scale deflection of the meter to be any desired percentage of input range.
Readout dials	Provide an in-line digital readout of the measured voltage, current, or resistance.

Figure 2-1. CONTROLS, TERMINALS AND INDICATORS

2-5. OPERATION AS A CONVENTIONAL DC VOLTMETER OR AMMETER

a. Perform the preliminary operating procedures of paragraph 2-3.

b. Place the Model 853A controls as follows:

MODE	+DC DIR
RANGE	1000 VOLTS or 1000 M A position. (The 10A position is used with an input to the 10 AMP INPUT terminals only).

c. Connect the circuit to be measured to the INPUT terminals. For current measurements in excess of 1 ampere, connect the measured circuit to the 10 AMP INPUT terminals.

d. Place the MODE switch to the appropriate +DC DIR or -DC DIR position to achieve a meter deflection from left to right.

e. Place the RANGE switch to the lowest voltage or current range possible while maintaining an on-scale meter deflection. The meter indication, multiplied by the RANGE switch position, is the value of the measured dc current or voltage.

2-6. OPERATION AS A DC DIFFERENTIAL VOLTMETER OR AMMETER

2-7. An improved accuracy of at least 10 times over that of the direct mode is available on the differential mode. To operate the instrument on the dc differential mode proceed as follows:

a. Determine the approximate value and polarity of the measured voltage or current by performing the operations contained in paragraph 2-5.

b. Place the readout dials to the meter deflection value of paragraph 2-5, step e.

c. Rotate the MODE switch one position clockwise to the DIFF position.

d. Rotate the NULL SENS control to achieve an on-scale meter deflection.

e. Rotate the readout dials for a center-zero meter indication while rotating the NULL SENS control to theHI (maximum clockwise) position.

f. The readout dials digit value multiplied by the RANGE switch position is the value of the measured dc current or voltage

2-8. OPERATION AS A CONVENTIONAL AC VOLTMETER OR AMMETER

a. Perform the preliminary operating procedures of paragraph 2-3.

b. Place the Model 853A controls as follows:

MODE	AC DIR
RANGE	1000 VOLTS or 1000 M A position. (The 10A position is used with an input to the 10 AMP INPUT terminals only.)

c. To prevent ground loop errors, it is recommended that the Model 853A be operated with the line cord unplugged (using battery power) or with a three prong to two prong line cord adaptor (floating the chassis from power line ground).

d. Connect the circuit to be measured to the INPUT terminals. For current measurements in excess of 1 ampere, connect the measured circuit to the 10 AMP INPUT terminals.

e. Place the RANGE switch to the lowest voltage or current range possible while maintaining an on-scale meter deflection. The meter indication, multiplied by the RANGE switch position, is the value of the measured ac current or voltage.

2-9. OPERATION AS AN AC DIFFERENTIAL VOLTMETER OR AMMETER

2-10. An improved accuracy of at least 10 times over that of the direct mode is available by the use of the differential mode. To operate the instrument on the ac differential mode proceed as follows:

a. Determine the approximate value of the measured voltage or current by performing the operations contained in paragraph 2-8.

b. Place the readout dials to the meter deflection value of paragraph 2-8, step .

c. Rotate the MODE switch clockwi e to the AC DIFF position.

d. Rotate the NULL SENS control to achieve an on-scale meter deflection.

e. Rotate the readout dials for a center-zero meter indicati n while rotating the NULL SENS control toward the HI (maximum clockwise) position.

NOTE!

When the NULL SENS control is to the HI position, meter sensitivity is approximately 0.1% full-scale which may cause excessive meter noise to be observed. If excessive meter noise is observed, reduce the NULL SENS to about one per cent full scale by rotating the vernier readout dial one per cent in either direction from the nulled value, and adjust the NULL SENS control for a full-scale meter indication. The vernier readout dial is then readjusted for a center-zero meter indication.

f. The readout dials digit value, multiplied by the RANGE switch position, is the value of the measured ac current or voltage.

2-11. OPERATION AS A CONVENTIONAL OHMMETER

a. Perform the preliminary operating procedures of paragraph 2-3.

b. Place the Model 853A controls as follows:

MODE	+DC DIR
RANGE	OHMS (as desired)

c. Connect the circuit or the resistance to be measured to the INPUT terminals. If one side of the resistance is at a ground potential, that side should be connected to the negative (-) input terminal.

d. Place the RANGE control to the OHMS position that maintains an on-scale meter deflection. The meter indication multiplied by the RANGE switch position is the value of the measured resistance.

2-12. OPERATION AS A DIFFERENTIAL OHMMETER

2-13. An improved accuracy of at least 10 times over that of the direct mode is available by the use of the differential ohmmeter mode. To operate the instrument as a differential ohmmeter proceed as follows:

a. Determine the approximate value of the measured resistance by performing the operations contained in paragraph 2-11.

b. Place the readout dials to the meter deflection value of paragraph 2-11, step d.

c. Rotate the MODE switch clockwise to the +DC DIFF position.

d. Rotate the NULL SENS control to achieve an on-scale meter deflection.

e. Rotate the readout dials for a center-zero meter indication while rotating the NULL SENS control to the HI (maximum clockwise) position.

f. The readout dials digit value, multiplied by the RANGE switch position, is the value of the measured resistance.

2-14. SERVICING INFORMATION

2-15. The John Fluke Manufacturing Co., Inc. warrants each instrument manufactured by them for the period of one year upon making delivery of the instrument to you, the original purchaser. Complete warranty information is contained in the Warranty page located at the rear of this manual.

2-16. If you should encounter any problem in the operation of your instrument, please feel free to contact your nearest John Fluke Sales Representative or write directly to the John Fluke Manufacturing Co., Inc. with a statement of your problem.

2-17. AMMETER OVERLOAD FUSE REPLACEMENT

2-18. Current measurements in RANGE switch positions of 1000 MA and below, which inadvertently exceed 2 amperes, are prevented from damaging the instrument circuits by fuse F1. The instrument may still be operated on the voltage or resistance modes after the fuse is blown, but the ammeter function is disabled. Replacement of the fuse, F1, is accomplished in the following manner:

a. Remove the four screws that attach the bottom dust cover to the instrument.

b. Locate the fuse F1 on the RANGE switch. The fuse is connected from deck one to deck four.

c. Cut the fuse leads at the end of the fuse and replace with a 3AG, 2 ampere pigtail fuse, by soldering it to the existing leads.

d. Replace the bottom dust cover and secure it to the instrument with the screws removed in step a.

e. The instrument is now ready for operation on all modes.

2-19. BATTERY REPLACEMENT

2-20. Battery replacement is necessary after extended use on the carbon battery, or upon failure of one or more of the nickel-cadmium cells. To replace the battery pack, proceed as follows:

a. Remove the four screws that attach the bottom dust cover to the instrument and remove the bottom dust cover from the instrument.

b. Locate the battery pack on the rear panel assembly. Disconnect the red and black battery pack wires from the printed circuit board terminals.

c. Remove the rear panel screws that secure the battery pack to the rear panel assembly and remove the battery pack from the instrument. If your instrument contains carbon batteries, perform steps d, and g through i of the following procedure. If your instrument contains rechargeable batteries, perform step e through i of the following procedure.

d. Replace the carbon battery pack with a new carbon battery pack using an Eveready 763 or equivalent, and secure it to the rear panel assembly with the screws removed in step c.

e. Locate the defective cell or cells in the rechargeable battery pack. Replace the cell or cells with an identical nickel-cadmium cell, Fluke part number 4002-160390. Observe proper polarity of connections when replacing nickel-cadmium cells.

f. Replace the rechargeable battery pack by securing it to the rear panel assembly with the screws removed in step c.

g. Connect the red and black battery pack wires to the printed circuit board terminals.

h. Replace the bottom cover and secure it to the instrument with the screws removed in step a.

i. Check the batteries as outlined in paragraph 2-3.

2-21. 230 VOLTS AC POWER LINE CONVERSION

2-22. The Model 853A may be converted for operation on 230 volt ac lines by modifying the input power transformer wiring. Factory modified versions will have a rear panel 230 volt decal installed. To convert the instrument from 115 volt line power to 230 volt line power, proceed as follows:

a. Remove the four screws that secure the top cover to the instrument and remove the top cover from the instrument.

b. Locate the printed circuit board connections in the left rear corner of the instrument labeled 115 and 230.

c. Remove the jumper wires from the 115 volt labeled terminals and solder them to the 230 volt labeled terminals.

d. Replace the rear panel fuse, F2, with a 3AG, 1/8 ampere slow-blow fuse.

e. Replace the top cover, securing it to the instrument with the screws removed in step a. The instrument will now operate on 230 volt ac power.

WARRANTY

The JOHN FLUKE MFG. CO., INC. warrants each instrument manufactured by them to be free from defects in material and workmanship. Their obligation under this Warranty is limited to servicing or adjusting an instrument returned to the factory for that purpose, and to making good at the factory any part or parts thereof; except tubes, fuses, choppers and batteries, which shall, within one year after making delivery to the original purchaser, be returned by the original purchaser with transportation charges prepaid, and which upon their examination shall disclose to their satisfaction to have been thus defective. If the fault has been caused by misuse or abnormal conditions of operation, repairs will be billed at a nominal cost. In this case, an estimate will be submitted before work is started, if requested.

If any fault develops, the following steps should be taken.

1. Notify the John Fluke Mfg. Co., Inc., giving full details of the difficulty, and include the Model number, type number, and serial number. On receipt of this information, service data or shipping instructions will be forwarded to you.

2. On receipt of the shipping instructions, forward the instrument prepaid, and repairs will be made at the factory. If requested, an estimate of the charges will be made before the work begins, provided the instrument is not covered by the Warranty.

SHIPPING

All shipments of John Fluke Mfg. Co., Inc. instruments should be made via Railway Express prepaid. The instrument should be shipped in the original packing carton; or if it is not available, use any suitable container that is rigid. If a substitute container is used, the instrument should be wrapped in paper and surrounded with at least four inches of excelsior or similar shock-absorbing material.

CLAIM FOR DAMAGE IN SHIPMENT

The instrument should be thoroughly inspected immediately upon receipt. All material in the container should be checked against the enclosed packing list. The manufacturer will not be responsible for shortages against the packing sheet unless notified immediately. If the instrument fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to John Fluke Mfg. Co., Inc. Upon receipt of this report you will be advised of the disposition of the equipment for repair or replacement. Include the model number, type number, and serial number when referring to this instrument for any reason.

The John Fluke Mfg. Co., Inc. will be happy to answer all application questions which will enhance your use of this instrument. Please address your requests to:

JOHN FLUKE MFG. CO., INC., P. O. BOX 7428, SEATTLE 33, WASHINGTON

Sales and Service Representatives

ALABAMA

HUNTSVILLE
BCS Associates, Inc.
2317 Bob Wallace Ave. S.W.
Tel. (205) 534-1648

ALASKA

SEATTLE
Instrument Specialists, Inc.
5950 Sixth Ave. South
Suite 106
Seattle, Washington
Tel. (206) 767-4260

ARIZONA

PHOENIX
Barnhill Associates
4900 E. Indian School Road
Tel. (602) 959-2115

CALIFORNIA

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Tel. (213) 665-5181

SAN FRANCISCO
Instrument Specialists, Inc.
2359 De La Cruz
Santa Clara, California
Tel. (408) 244-1505

COLORADO

DENVER
Barnhill Associates
1170 S. Sheridan Blvd.
Tel (303) 934-5505

CONNECTICUT

HARTFORD
Instrument Representatives, Inc.
P.O. Box 165
Glastonbury, Connecticut
Tel. (203) 633-0777

FLORIDA

ORLANDO
BCS Associates, Inc.
940 N. Fern Creek Ave.
Tel. (305) 425-2764

HAWAII

HONOLULU
Industrial Electronics, Inc.
646 Queen Street
Tel. (808) 506-095

ILLINOIS

CHICAGO
Cozzens & Cudahy, Inc.
9501 W. Devon Ave.
Rosemont, Illinois
Tel. (312) 825-1144

INDIANA

INDIANAPOLIS
Cozzens & Cudahy, Inc.
44 Kirk Drive
Tel. (317) 244-2456

LOUISIANA

NEW ORLEANS
BCS Associates, Inc.
P.O. Box 7371
Metairie, Louisiana
Tel. (504) 888-2266

MARYLAND

BALTIMORE
Electronic Marketing Assoc.
11501 Huff Court
Kensington, Maryland
Tel. (301) 744-7700

MASSACHUSETTS

BOSTON
Instrument Representatives, Inc.
1046 Massachusetts Avenue
Arlington, Massachusetts
Tel. (617) 646-1034

MICHIGAN

DETROIT
Technitron, Inc.
13657 Grand River Ave.
Tel. (313) 838-7324

MINNESOTA

MINNEAPOLIS
Cozzens & Cudahy, Inc.
7710 Computer Ave.
Tel. (612) 920-1022

MISSOURI

ST. LOUIS
Cozzens & Cudahy, Inc.
10534 Natural Bridge Road
Edmundson, Missouri
Tel. (314) 423-1234

NEW JERSEY

NEWARK
SBM Associates, Inc.
1519 Stuyvesant Avenue
Union, New Jersey
Tel. (201) 687-8737

NEW MEXICO

ALBUQUERQUE
Barnhill Associates
827 Pennsylvania Ave.
Tel. (505) 265-7766

NEW YORK

NEW YORK
SBM Associates, Inc.
28 Hobby Street
Pleasantville, New York
Tel. (914) 769-1811

LONG ISLAND
SBM Associates, Inc.
528 Old Country Road
Plainview, Long Island
Tel. (516) 433-1421

ROCHESTER
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800 Linden Avenue
Tel. (716) 381-8330

SYRACUSE
SBM Associates, Inc.
138 Pickard Bldg.
5858 E. Molloy Road
Tel. (315) 454-9377

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GREENSBORO
BCS Associates, Inc.
1039 E. Wendover Avenue
Tel. (919) 273-1918

OHIO

CLEVELAND
Technitron, Inc.
23203 Lorain Road
North Olmsted, Ohio
Tel. (216) 734-0960

DAYTON
Technitron, Inc.
1250 W. Dorothy Lane
Tel. (513) 298-9964

OREGON

PORTLAND
Instrument Specialists, Inc.
5950 Sixth Ave. South
Suite 106
Seattle, Washington
Tel. (206) 767-4260

PENNSYLVANIA

PHILADELPHIA
Acromatix Associates, Inc.
3118 Germantown Pike
Fairview Village, Pennsylvania
Tel. (215) 279-0377

PITTSBURGH
Technitron, Inc.
114 Spring Grove Road
Tel. (412) 371-1231

TEXAS

DALLAS
Barnhill Associates
507B Bishop Street
Richardson, Texas
Tel. (214) AD 1-2573

HOUSTON
Barnhill Associates
Suite 203
3810 Westheimer
Tel. (713) NA 1-0040

WASHINGTON

SEATTLE
Instrument Specialists, Inc.
5950 Sixth Ave. South
Suite 106
Seattle, Washington
Tel. (206) 767-4260

WASHINGTON, D.C.

Electronic Marketing Associates
11501 Huff Court
Kensington, Maryland
Tel. (301) 946-0300

CANADA

BRITISH COLUMBIA

VANCOUVER
Allan Crawford Associates, Ltd.
5901 East Broadway
North Burnaby 2, B.C.
Tel. (604) 291-7161

ONTARIO

OTTAWA
Allan Crawford Associates, Ltd.
376 Churchill Avenue — Suite 106
Tel. (613) 725-1288

TORONTO
Allan Crawford Associates, Ltd.
65 Martin Ross Avenue
Downsview, Ontario
Tel. (416) 636-4910

QUEBEC

MONTREAL
Allan Crawford Associates, Ltd.
6999 Cote de Neiges Road
Tel. (514) 739-6776

International Representatives

AUSTRALIA
Elmesco Instruments
41 Carter Road
Brookvale, N.S.W., Australia

AUSTRIA
Omni Ray AG
Techn. Beratung
Mollardgasse 54
Vienna VI, Austria

BELGIUM
C. N. Rood S/A
30 Rue Leon Frederic
Brussels 4, Belgium

DENMARK
Tage Olsen A/S
Ronnegade 1-0
Copenhagen, Denmark

FINLAND
Oy Findip AB Ltd.
Mannerheimintie 29C
Helsinki 25, Finland

FRANCE
S. E. R. I. E. L., s. a.
48 Avenue Victor Hugo
Clamart (Seine) France

HONG KONG and MACAO
Intronics Ltd.
4 Hankow Road, Suite 4A
Kowloon, Hong Kong

ISRAEL
R. D. T. Electronics
Engineering Ltd.
P.O. Box 21082
13 Dov-Hos Street
Tel-Aviv, Israel

ITALY
Elettronucleonica s. p. a.
7 Pizza DeAngli
20146 Milano, Italy

JAPAN
Toyo Trading Co., Ltd.
Central P.O. Box 999
Tokyo, Japan

Toyo Trading Co., Ltd.
4-37, Minamihonmachi
Higashika, Osaka, Japan

KOREA
M. - C International
Room 516, Bando Building
Seoul, Korea

THE NETHERLANDS
C. N. Rood N. V.
Post Office Box 4542
Rijswijk (Z. H.) The Netherlands

Fluke Nederland N. V.
Post Office Box 5053
Tilburg, The Netherlands

NEW ZEALAND
Sample Electronics (N. Z.) Ltd.
8 Matipo Street
Onehunga
Auckland, New Zealand

NORWAY
Morgenstierne & Co. A/S
Wesselsgt. 6
Oslo, Norway

OKINAWA
RYUKYU ISLANDS
Baxter Trading Co.
P.O. Box 26
Koza, Okinawa
Ryukyu Islands

PHILIPPINES
T. J. Wolff
2246 Pasong Tamo
Makati, Rizal
Manila, Philippines

SOUTH AFRICA
A. C. Gowlett (Pty.) Ltd.
P.O. Box 1257
Johannesburg, So. Africa

A. C. Gowlett (Pty.) Ltd.
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Saigon, Vietnam

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REMA
Calle General Sanjurjo, 18
Madrid, Spain

SWEDEN
Robert E. O. Olsson
Box 165
Tradgardsgatan 7
Motala, Sweden

SWITZERLAND
Omni Ray AG
Dufourstrasse 56
8008 Zurich, Switzerland

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Heighten Scientific Co., Ltd.
P.O. 1408
Taipei, Taiwan

THAILAND
G. Simon Radio Ltd.
30 Patpong Avenue
Suriwong
Bangkok, Thailand

THE UNITED KINGDOM
Fluke International Corp.
P.O. Box 102
Watford-Herts, England

WEST GERMANY
Rohde & Schwarz Vertriebs - Gmbh
5000 Koeln
Hohe Strasse 160-168
West Germany

Rohde & Schwarz Handels - Gmbh
1000 Berlin 10
Ernst - Reuter - Platz 10
West Germany

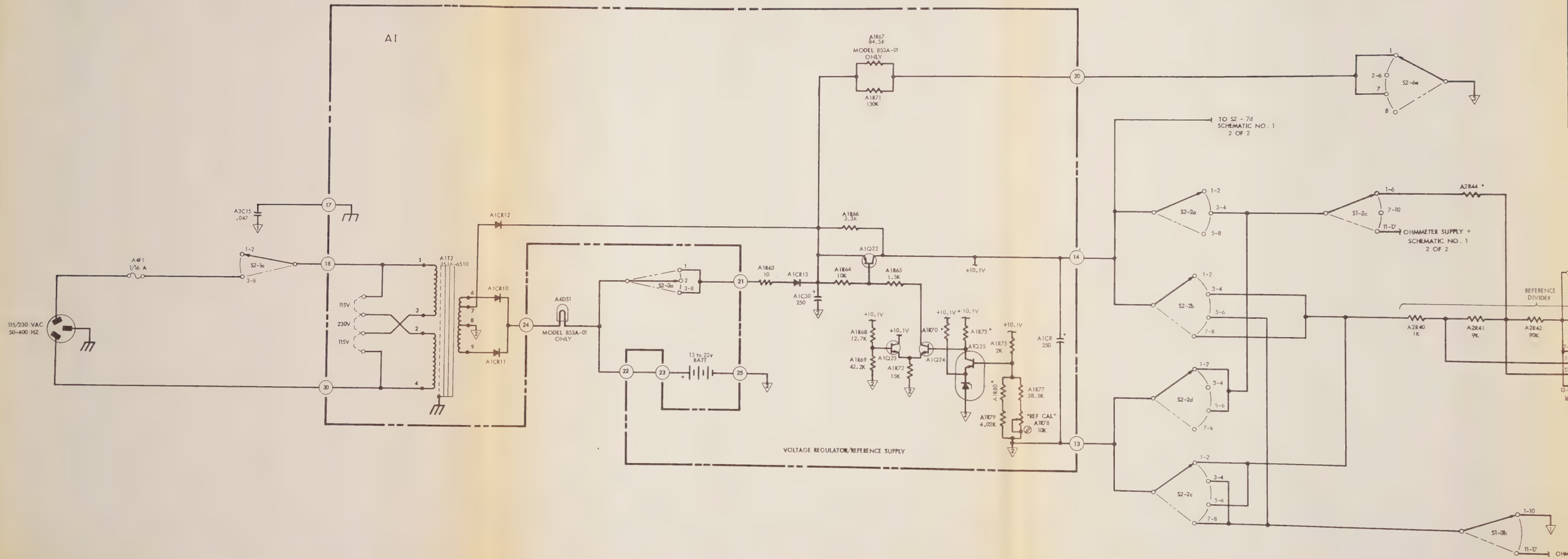
Rohde & Schwarz Vertriebs - Gmbh
2000 Hamburg 50
Grosse Bergstrasse 213-217
West Germany

Rohde & Schwarz Vertriebs - Gmbh
7500 Karlsruhe
Kriegsstrasse 39
West Germany

Rohde & Schwarz Vertriebs - Gmbh
8000 Muenchen
Dachauer Strasse 109
West Germany

In Europe contact FLUKE NEDERLAND, N. V., Post Office Box 5053, Tilburg, The Netherlands

FLUKE


A1
A4F1
1/16 A
115/230 VAC
50-400 HZ
S2-1a
A3C15
.047
A1T2
853A-6510
115V
230V
115V
A1CR12
A1CR10
A1CR11
A4D51
MODEL 853A-01
ONLY
S2-3a
13 to 22v
BATT
A1R67
84.5K
MODEL 853A-01
ONLY
A1R71
130K
A1R63
10
A1CR13
A1C30
250
A1R66
3.3K
A1Q22
A1R64
10K
A1R65
1.5K
+10.1V
A1R68
12.7K
A1R69
42.2K
A1Q23
A1R72
15K
A1R70
A1Q24
A1R73 *
A1Q25
A1R75
2K
A1R80 *
A1R77
38.3K
A1R79
4.02K
"REF CAL"
A1R78
10K
A1C8
250
VOLTAGE REGULATOR/REFERENCE SUPPLY
TO S2 - 7d
SCHEMATIC NO. 1
2 OF 2
S2-6a
S2-2a
S2-2b
S2-2d
S2-2c
S1-2c
A2R44 *
OHMMETER SUPPLY +
SCHEMATIC NO. 1
2 OF 2
REFERENCE
DIVIDER
A2R40
1K
A2R41
9K
A2R42
90K
S1-3b
1-10
11-17

NOTES:

A1- P/C BOARD ASSEMBLY

A2- RANGE SWITCH ASSEMBLY

A3- MODE SWITCH ASSEMBLY

A4- FINAL ASSEMBLY

A5- DECADE POTENTIOMETER, DECK "A", ASSEMBLY

A6- DECADE POTENTIOMETER, DECK "B", ASSEMBLY

A7- FRONT PANEL ASSEMBLY

FLAGNOTES INDICATE CIRCUIT CONNECTIONS TO LIKE FLAGNOTES

ALL CAPACITOR VALUES ARE IN uf UNLESS OTHERWISE NOTED

FACTORY SELECTED COMPONENT

NUMBERS CONTAINED ON SWITCHES ARE SWITCH POSITIONS

REFERENCE COMMON

REFERENCE SUPPLY NEGATIVE RETURN

NULL DETECTOR COMMON #1

NULL DETECTOR COMMON #2

SWITCH FUNCTIONS:

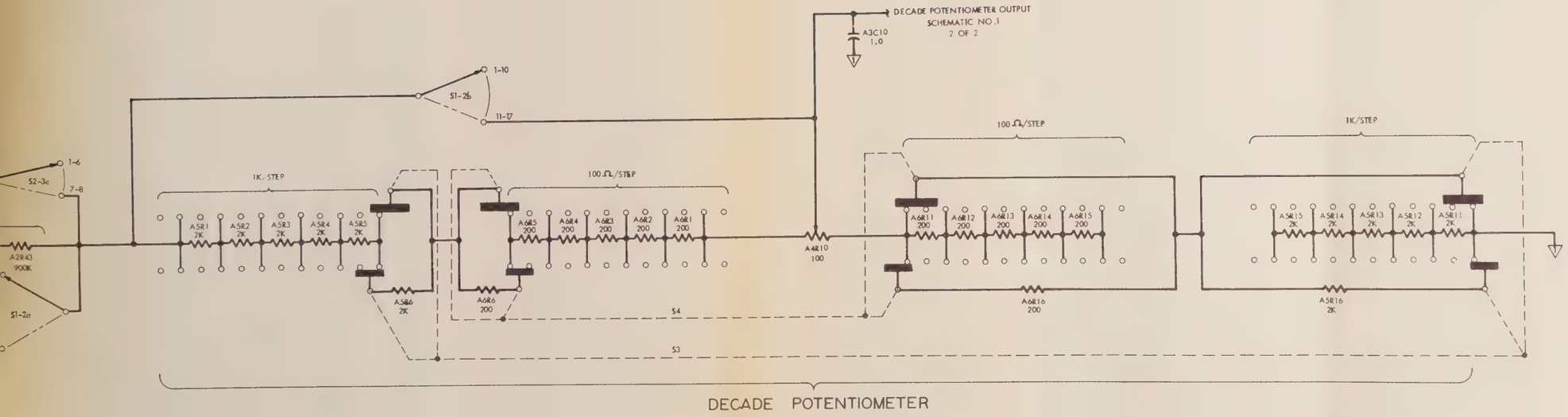
MODE SWITCH - S2	
POSITION	FUNCTION
1	BAT CHK
2	OFF
3	+ DC DIR
4	+ DC DIFF
5	- DC DIR
6	- DC DIFF
7	AC DIR
8	AC DIFF

RANGE SWITCH - S1	
POSITION	FUNCTION
1	.1 MA
2	1 MA
3	10 MA
4	100 MA
5	1000 MA
6	10 A
7	1 VOLTS
8	10 VOLTS
9	100 VOLTS
10	1000 VOLTS
11	100M OHMS
12	10M OHMS
13	1M OHMS
14	100K OHMS
15	10K OHMS
16	1K OHMS
17	100 OHMS

SWITCH NOTES:

S1 - 4 a

SWITCH NO. DECK NO. FUNCTION



R SUPPLY RETURN
ATIC NO. 1
OF 2

FUNCTIONAL SCHEMATIC

SCHEMATIC NO 1 1 OF 2

MULTIMETER

MODEL 853A

SER NO 123 & ON

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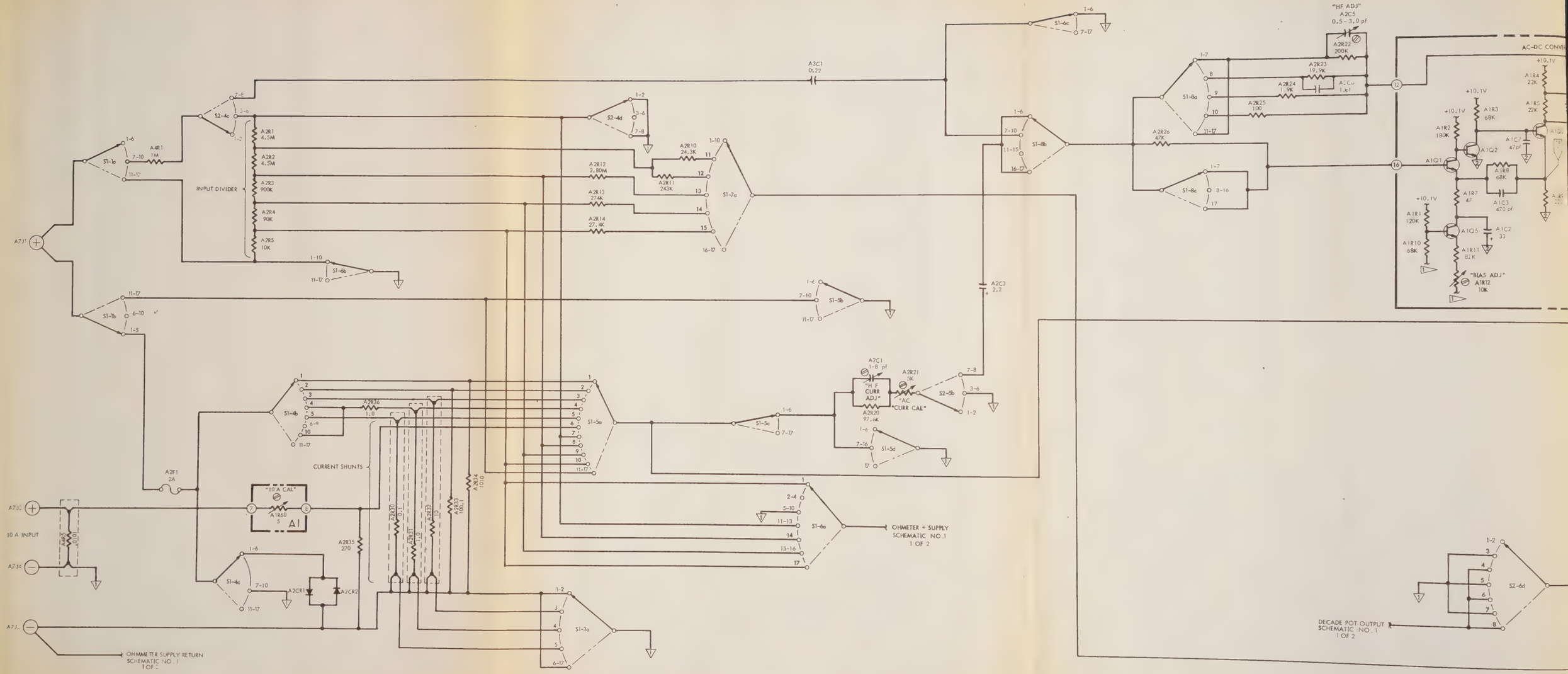
A7J1
A7J2
A7J3
10 A INPUT
A4R1 1M
INPUT DIVIDER
A2R1 4.5M
A2R2 4.5M
A2R3 900K
A2R4 90K
A2R5 10K
A4R2 .001
A2F1 2A
"10 A CAL"
A1R60 5
A1
CURRENT SHUNTS
A2R34 10.0
A2R35 270
A2R36 1.0
A2R37 .1
A2R38 1.0
A2R39 10
A2R40 100.1
A2CR1
A2CR2
A2R12 2.80M
A2R13 274K
A2R14 27.4K
A2R10 24.3K
A2R11 243K
A3C1 0.22
A2C3 2.2
A2C1 1-8 pf
"H F CURR ADJ"
A2R21 5K
"AC "CURR CAL"
A2R20 97.6K
"HF ADJ"
A2C5 0.5 - 3.0 pf
A2R22 200K
A2R23 19.9K
A2C4 1.4 f
A2R24 1.9K
A2R25 100
A2R26 47K
AC-DC CONVERTER
+10.1V
A1R4 22K
A1R5 22K
A1R3 68K
A1R2 180K
A1C7 47pf
A1Q1
A1Q2
A1R8 68K
A1C3 470 pf
A1R7 47
A1R1 120K
A1Q5
A1C2 33
A1R10 68K
A1R11 82K
"BIAS ADJ" A1R12 10K
S1-1a
S1-1b
S1-1c
S1-2a
S1-2b
S1-2c
S1-3a
S1-3b
S1-3c
S1-4a
S1-4b
S1-4c
S1-5a
S1-5b
S1-5c
S1-5d
S1-6a
S1-6b
S1-6c
S1-6d
S1-7a
S1-8a
S1-8b
S1-8c
S2-4c
S2-4d
S2-5b
S2-6d
OHMMETER + SUPPLY SCHEMATIC NO. 1 1 OF 2
OHMMETER SUPPLY RETURN SCHEMATIC NO. 1 1 OF 2
DECADE POT OUTPUT SCHEMATIC NO. 1 1 OF 2

NOTES:
FOR NOTES SEE SCHEMATIC NO. 1 1 OF 2

SWITCH FUNCTIONS:

RANGE SWITCH - S1	
POSITION	FUNCTION
1	.1 MA
2	1 MA
3	10 MA
4	100 MA
5	1000 MA
6	10 A
7	1 VOLTS
8	10 VOLTS
9	100 VOLTS
10	1000 VOLTS
11	100M OHMS
12	10M OHMS
13	1M OHMS
14	100K OHMS
15	10K OHMS
16	1000 OHMS
17	100 OHMS

MODE SWITCH - S2	
POSITION	FUNCTION
1	BAT CHK
2	OFF
3	+ DC DIR
4	+ DC DIFF
5	- DC DIR
6	- DC DIFF
7	AC DIR
8	AC DIFF

A1

NULL DETECTOR AMPLIFIER

INVERTER/ISOLATOR

A1T1 B53A-6010

"AC CAL"

"MTR CAL"

"DIFF -"

"DIFF +"

"ZERO"

"NULL SENS"

NULL DETECTOR OUTPUT (± 1V)

TO A1 PIN 14 SCHEMATIC NO. 1 1 OF 2

+10.1V SCHEMATIC NO. 1 1 OF 2

FUNCTIONAL SCHEMATIC
SCHEMATIC NO. 1 2 OF 2

MULTIMETER
MODEL 853A
SER. NO. 123 & ON

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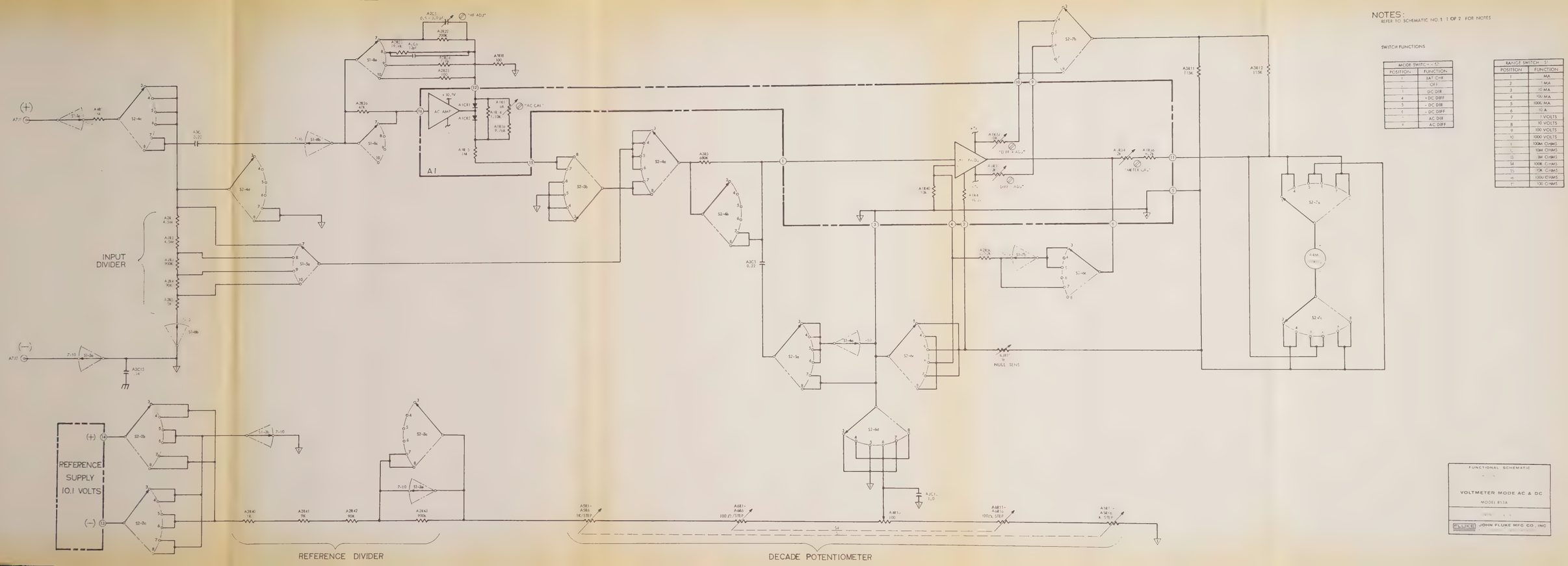
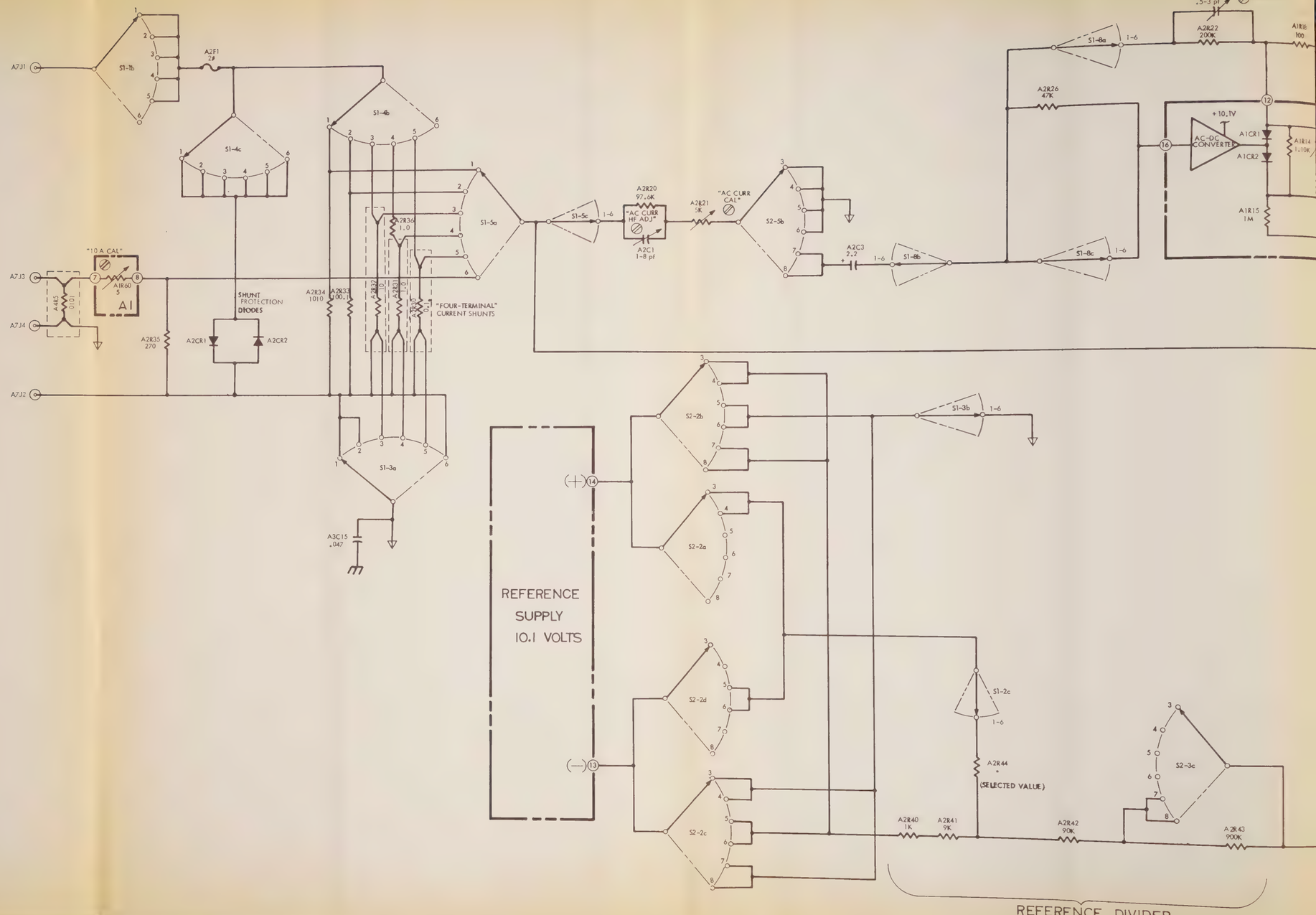
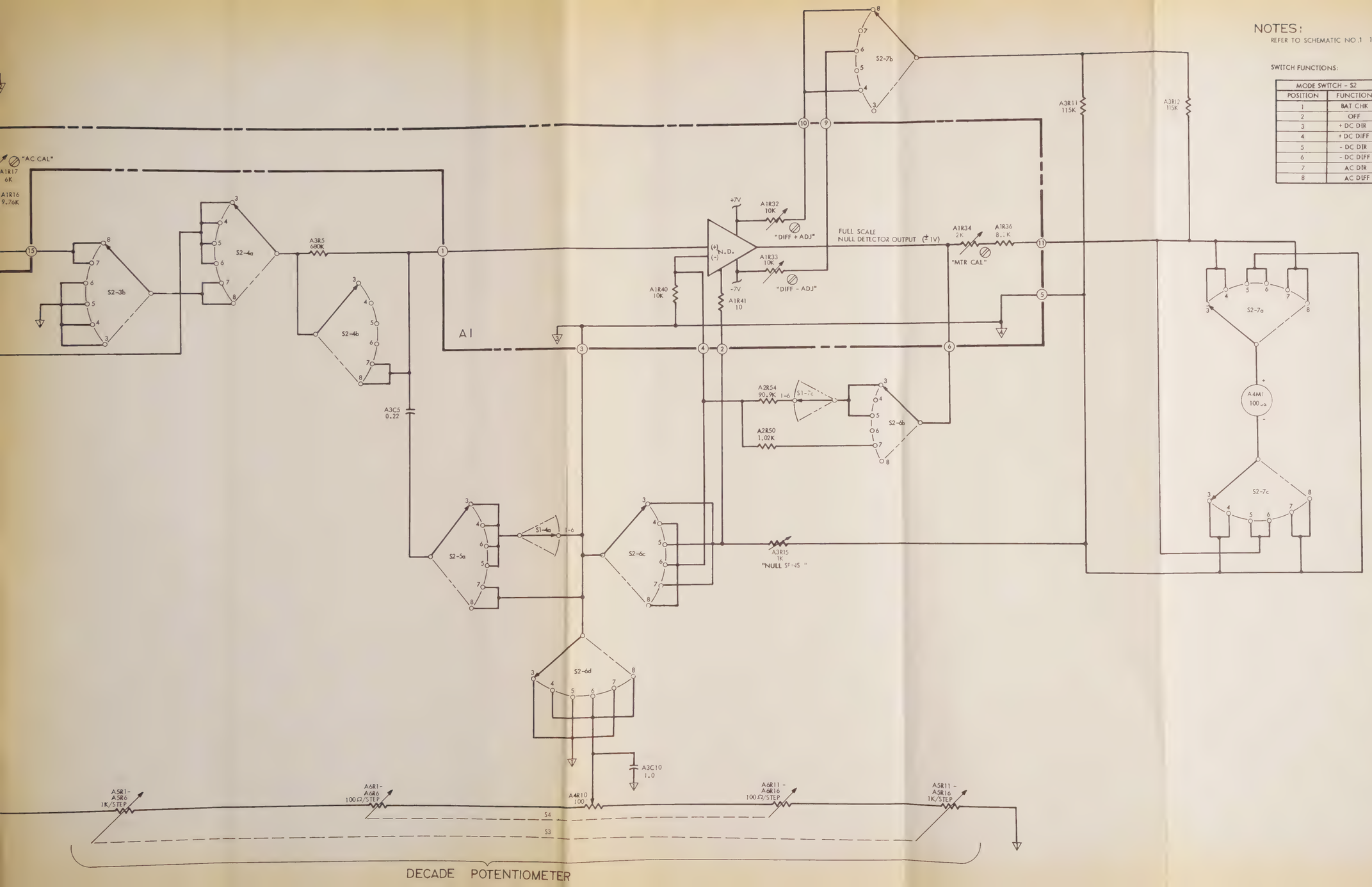

NOTES:
REFER TO SCHEMATIC NO. 1 OF 2 FOR NOTES
SWITCH FUNCTIONS
A1 FUNCTION SWITCH - S1
POSITION | FUNCTION
1 | 2A* OHM
2 | OFF
3 | DC DIR
4 | + DC DIFF
5 | - DC DIR
6 | - DC DIFF
7 | AC DIR
8 | AC DIFF
RANGE SWITCH - S2
POSITION | FUNCTION
1 | MA
2 | MA
3 | 10 MA
4 | 100 MA
5 | 1000 MA
6 | 10 A
7 | 1 VOLTS
8 | 10 VOLTS
9 | 100 VOLTS
10 | 1000 VOLTS
11 | 100K OHMS
12 | 10M OHMS
13 | 1M OHMS
14 | 100K OHMS
15 | 10K OHMS
16 | 1000 OHMS
17 | 100 OHMS
INPUT DIVIDER
REFERENCE SUPPLY 10.1 VOLTS
REFERENCE DIVIDER
DECADE POTENTIOMETER
A1
AC AMP
"HF ADJ"
"AC CAL"
"ZERO ADJ"
"METER ADJ"
NULL SENS
FUNCTIONAL SCHEMATIC
VOLTMETER MODE AC & DC
MODEL 893A
JOHN FLUKE MFG. CO., INC.


A7J1
A7J3
A7J4
A7J2
S1-1b
S1-4c
S1-4b
S1-5a
S1-3a
A2F1
2A
"10 A CAL"
A1R60
5
A1
A4R5
0.01
SHUNT
PROTECTION
DIODES
A2CR1
A2CR2
A2R35
270
A2R34
1010
A2R33
100.1
A2R32
10
A2R31
1.0
A2R36
1.0
0.1
"FOUR-TERMINAL"
CURRENT SHUNTS
A3C15
.047
S1-5c
A2R20
97.6K
"AC CURR
HF ADJ"
A2C1
1-8 pf
A2R21
5K
"AC CURR
CAL"
S2-5b
A2C3
2.2
S1-8b
S1-8a
S1-8c
A2C5
.5-3 pf
"HF ADJ"
A2R22
200K
A1R16
100
A2R26
47K
+10.1V
AC-DC
CONVERTER
A1CR1
A1CR2
A1R14
1.10K
A1R15
1M
REFERENCE
SUPPLY
10.1 VOLTS
S2-2b
S2-2a
S2-2d
S2-2c
S1-3b
S1-2c
A2R44
*
(SELECTED VALUE)
S2-3c
A2R40
1K
A2R41
9K
A2R42
90K
A2R43
900K
REFERENCE DIVIDER



NOTES:

REFER TO SCHEMATIC NO.1 1 OF 2 FOR NOTES

SWITCH FUNCTIONS:

MODE SWITCH - S2	
POSITION	FUNCTION
1	BAT CHK
2	OFF
3	+ DC DIR
4	+ DC DIFF
5	- DC DIR
6	- DC DIFF
7	AC DIR
8	AC DIFF

RANGE SWITCH - S1	
POSITION	FUNCTION
1	.1 MA
2	1 MA
3	10 MA
4	100 MA
5	1000 MA
6	10 A
7	1 VOLTS
8	10 VOLTS
9	100 VOLTS
10	1000 VOLTS
11	100M OHMS
12	10M OHMS
13	1M OHMS
14	100K OHMS
15	10K OHMS
16	1000 OHMS
17	100 OHMS

FUNCTIONAL SCHEMATIC

SCHEMATIC NO 3

AMMETER MODE AC & DC

MODEL 853A

SER NO 123 & ON

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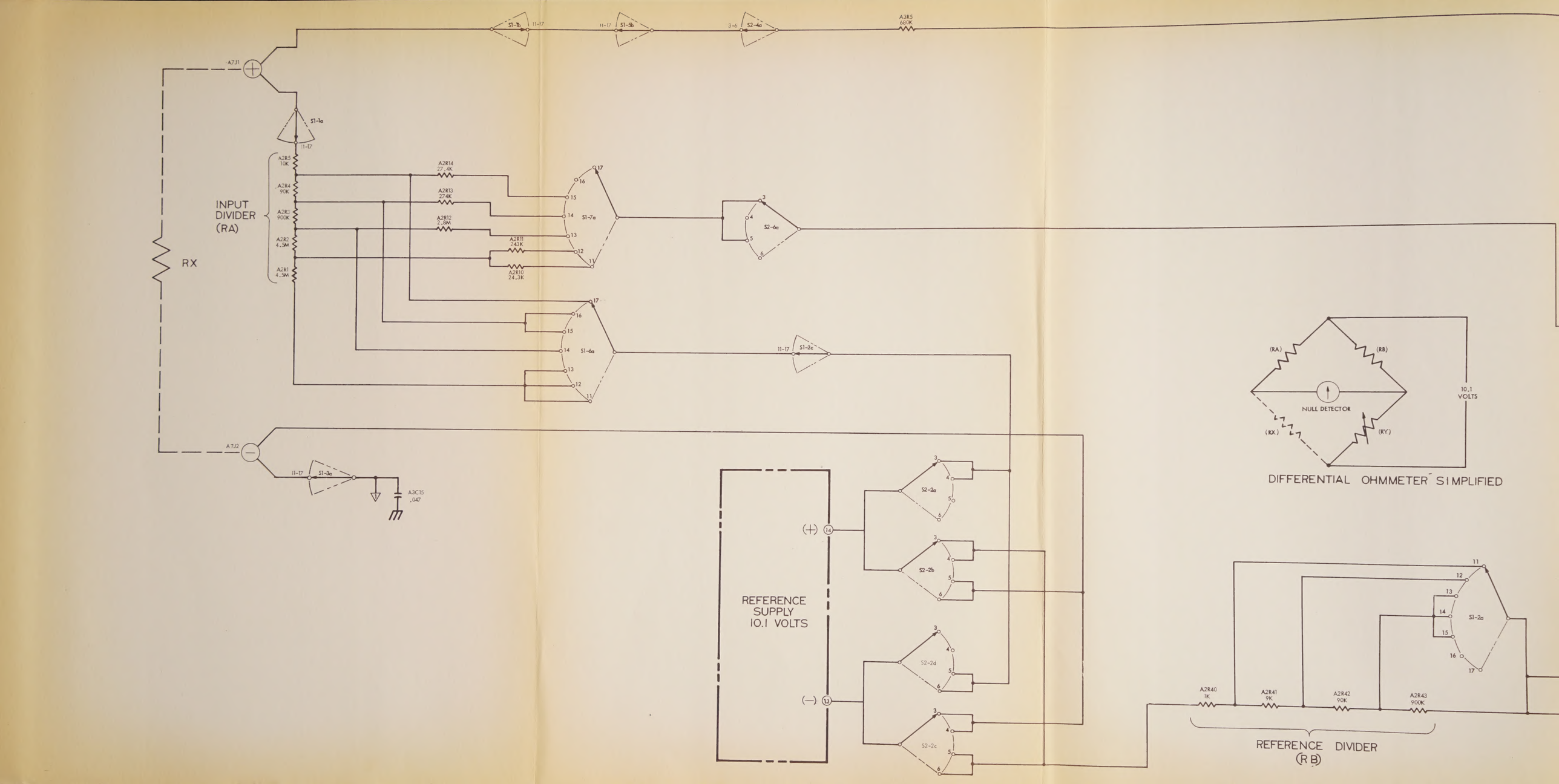
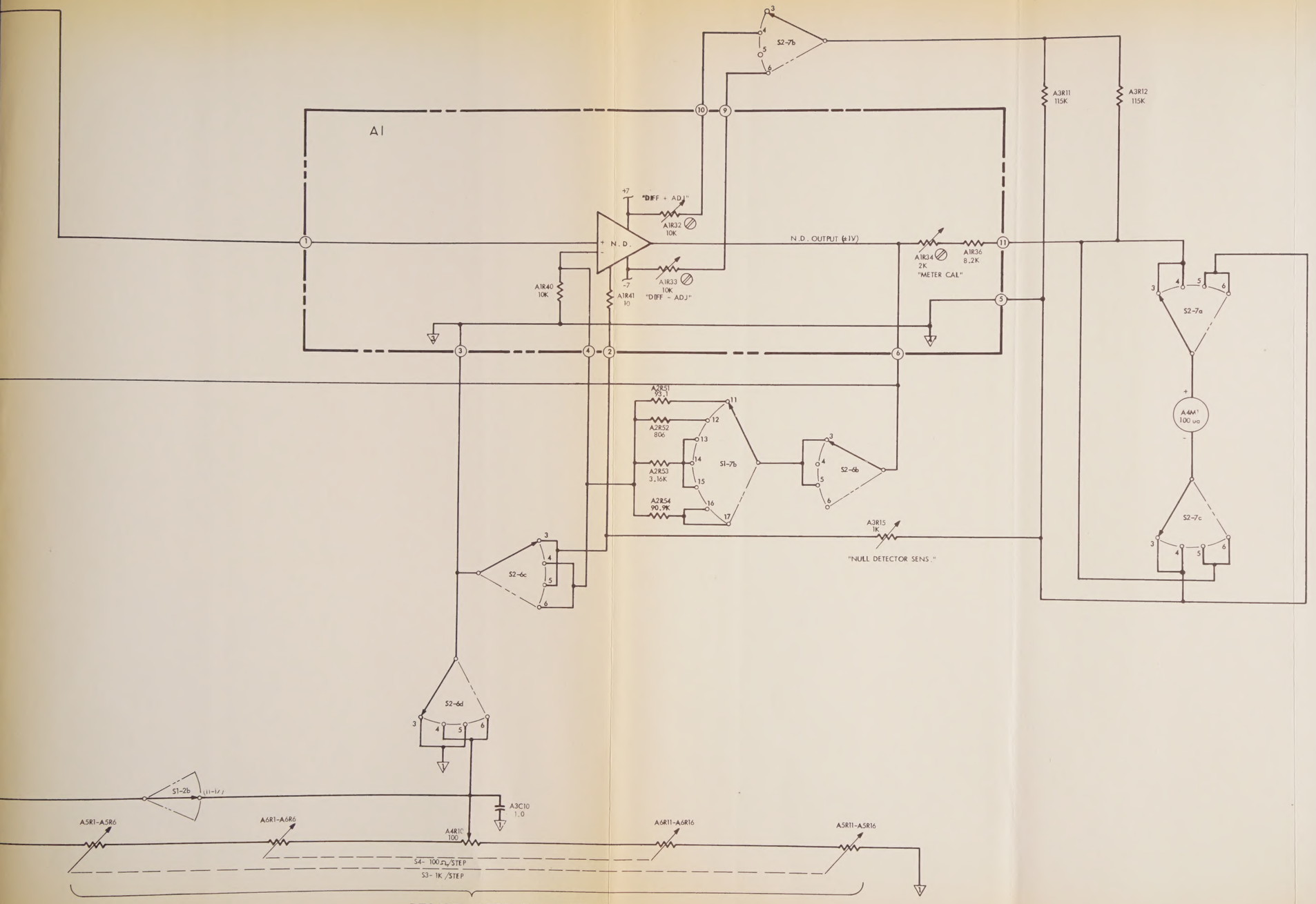

A7J1
A7J2
RX
INPUT DIVIDER (RA)
A2R5 10K
A2R4 90K
A2R3 900K
A2R2 4.5M
A2R1 4.5M
A2R14 27.4K
A2R13 274K
A2R12 2.8M
A2R11 243K
A2R10 24.3K
S1-1a
S1-1b
S1-2c
S1-3a
S1-3b
S1-6a
S1-7a
S2-2a
S2-2b
S2-2c
S2-2d
S2-4a
S2-6a
A3R5 680K
A3C15 .047
11-17
3-6
REFERENCE SUPPLY 10.1 VOLTS
(+)
(-)
A2R40 1K
A2R41 9K
A2R42 90K
A2R43 900K
REFERENCE DIVIDER (RB)
(RA)
(RB)
(RX)
(RY)
NULL DETECTOR
10.1 VOLTS
DIFFERENTIAL OHMMETER SIMPLIFIED



NOTES :

REFER TO SCHEMATIC NO. 1 1 OF 2 FOR NOTES

SWITCH FUNCTIONS :

MODE SWITCH - S2	
POSITION	FUNCTION
1	BAT CHK
2	OFF
3	+ DC DIR
4	+ DC DIFF
5	- DC DIR
6	- DC DIFF
7	AC DIR
8	AC DIFF

RANGE SWITCH - S1	
POSITION	FUNCTION
1	.1 MA
2	1 MA
3	10 MA
4	100 MA
5	1000 MA
6	10 A
7	1 VOLTS
8	10 VOLTS
9	100 VOLTS
10	1000 VOLTS
11	100M OHMS
12	10M OHMS
13	1M OHMS
14	100K OHMS
15	10K OHMS
16	1000 OHMS
17	100 OHMS

FUNCTIONAL SCHEMATIC

SCHEMATIC NO. 4

OHMMETER MODEL

MODEL 853A

SER NO. 123 & ON

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